

Docket 1563 (Wright)

BEST AVAILABLE COPY

Amendment

Cancel claims 1-8 and 22-25 a withdrawn as shown on the attached Listing of claims.

At claim 9, line 3 insert - a) compression molding a nanocomposite or molecular-composite polymer to be foamed into a consolidated shape;

At claim 9, line 3 delete "a)" and substitute -- b) --;

At claim 9, line 7 delete "b)" and substitute -- c) --;

At claim 9, line 7 delete "c)" and substitute -- d) --.

All as shown on the attached Listing of claims.

Docket 1563 (Wright)

Listing of Claims

- 1) (Withdrawn) A process for the production of microcellular nanocomposite or molecular-composite polymer foam shape comprising:
 - a) saturating a consolidated nanocomposite or molecular-composite polymer shape with an inert gas at an elevated pressure above and at a temperature above the glass transition temperature of the polymer;
 - b) fully or partially releasing the pressure; and
 - c) controllably quenching the nanocomposite or molecular-composite polymer shape to a temperature below the glass transition temperature of the polymer.
- 2) (Withdrawn) The process of claim 1 wherein said quenching is performed by reducing the temperature of the polymer shape to below the glass transition temperature of the polymer while maintaining said elevated pressure in an inert atmosphere.
- 3) (Withdrawn) The process of claim 1 wherein said quenching is performed by partially reducing said elevated pressure, cooling said polymer shape to a temperature below the glass transition temperature of said polymer, and reducing the pressure to ambient.

Docket 1563 (Wright)

- 4) (Withdrawn) The process of claim 1 wherein saturating is performed at a pressure above about 1000 psi.
- 5) (Withdrawn) The process of claim 1 wherein said inert gas is selected from the group consisting of nitrogen, argon, helium, and carbon dioxide.
- 6) (Withdrawn) The process of claim 1 said polymer shape is consolidated prior to saturating by the application of pressure above about 8000 psi when said consolidation is performed at room temperature.
- 7) (Withdrawn) The process of claim 1 wherein said nanocomposite or molecular-composite is blended with a solvent prior to consolidation.
- 8) (Withdrawn) The process of claim 8 wherein said nanocomposite or said molecular-composite is blended with from about 50 to about 150 weight percent of said solvent prior to consolidation.
- 9) (Currently Amended) A microcellular nanocomposite or molecular-composite polymer foam shape produced by a process comprising:
- a) compression molding a nanocomposite or molecular-composite polymer to be foamed into a consolidated shape;

Docket 1563 (Wright)

[[a)]] b) saturating [[a)] the consolidated shape of a nanocomposite or molecular-composite polymer to be foamed with an inert gas at an elevated pressure [[above]] and at a temperature above the glass transition temperature of said polymer;

[[b)]] c) fully or partially releasing the pressure; and

[[c)]] d) controllably quenching said polymer shape to a temperature below the glass transition temperature of the polymer.

10) (Original) The microcellular nanocomposite or molecular-composite polymer foam of claim 9 wherein said quenching is performed by reducing the temperature of the nanocomposite or molecular composite polymer shape to below the glass transition temperature of the nanocomposite or molecular composite polymer while maintaining said elevated pressure in an inert atmosphere.

11) (Original) The microcellular nanocomposite or molecular-composite polymer foam of claim 9 wherein said quenching is performed by reducing the temperature of the nanocomposite or molecular-composite polymer shape to below the glass transition temperature of the nanocomposite or molecular-composite polymer while maintaining said elevated pressure in an inert atmosphere.

Docket 1563 (Wright)

- 12) (Original) The microcellular nanocomposite or molecular-composite polymer foam of claim 9 wherein said saturating is performed at a pressure above about 1000 psi.
- 13) (Original) The microcellular nanocomposite or molecular-composite polymer foam of claim 9 wherein said inert gas is selected from the group consisting of nitrogen, argon, helium, and carbon dioxide.
- 14) (Original) The microcellular nanocomposite or molecular-composite polymer foam of claim 9 wherein said nanocomposite or molecular-composite polymer shape is consolidated prior to saturating by heating said polymer to its softening point under an inert atmosphere and a pressure above about 8000 psi.
- 15) (Original) The microcellular nanocomposite or molecular-composite polymer foam of claim 9 wherein said polymer shape comprises up to about 30 weight percent of a filler selected from the group consisting of chopped glass fibers, carbon fibers, metallic fibers, aramid fibers, ceramic whiskers, ceramic fibers and calcium carbonate powder.

Docker 1563 (Wright)

- 16) (Original) The microcellular nanocomposite or molecular-composite foam shape of claim 9 wherein said nanocomposite or molecular-composite is blended with a solvent prior to consolidation.
- 17) (Original) The microcellular nanocomposite or molecular-composite foam shape of claim 16 wherein said nanocomposite or said molecular-composite is blended with from about 50 to about 150 weight percent of said solvent.
- 18) (Original) The microcellular nanocomposite foam shape of claim 9 wherein said nanocomposite is selected from the group consisting of blends of nanofibers or nano powders with a polymer and polyhedral oligomeric silsesquioxanes.
- 19) (Original) The microcellular molecular-composite foam shape of claim 9 wherein said molecular-composite comprises rigid rod polymer molecules dispersed in a matrix of a flexible coil polymer at the molecular level.
- 20) (Original) The microcellular molecular-composite foam shape of claim 19 wherein said molecular-composite comprises a member selected from the group consisting of the p-terephthaloylamide/nylon system, the poly-p-phenylenebenzobisthiazole/poly-2, 5 (6)-benzimidazole system and the polybenzobisthiazole (PBZT) and 2-sulfo-PBI rigid-rod polymer systems.

Docket 1563 (Wright)

- 21) (Original) The microcellular molecular-composite foam shape of claim 19 wherein said rigid rod polymer comprises a polymer selected from the group consisting of polybenzimidazole (PBI), sulfopolybenzimidazole (2-Sulfo-PBI), polybenzobisthiazole (PBT), sulfopolybenzobisthiazole (SPBT), sulfopolybenzobisthiazole (SBPPBT), polybenzobisoxazole (PBO), hydroxy functionalized copolymer of polybenzoxazole (HPBO), and polyimide.
- 22) (Withdrawn) The process of claim 1 wherein said nanocomposite is selected from the group consisting of blends of nanofibers or nano powders with a polymer and polyhedral oligomeric silsesquioxanes.
- 23) (Withdrawn) The process of claim 1 wherein said molecular-composite comprises rigid rod polymer molecules dispersed in a matrix of a flexible coil polymer at the molecular level.
- 24) (Withdrawn) The process of claim 1 wherein said molecular-composite comprises a member selected from the group consisting of the p-terephthaloylamide/nylon system, the poly-p-phenylenebenzobisthiazole/poly-2, 5 (6)-benzimidazole system and the polybenzobisthiazole (PBZT) and 2-sulfo-PBI rigid-rod polymer systems.

Docket 1563 (Wright)

25) (Withdrawn) The process of claim 23 wherein said rigid rod polymer comprises a polymer selected from the group consisting of polybenzimidazole (PBI), sulfopolybenzimidazole (2-Sulfo-PBI), polybenzobisthiazole (PBT), sulfopolybenzobisthiazole (SPBT), sulfopolybenzobisthiazole (SBPPBT), polybenzobisoxazole (PBO), hydroxy functionalized copolymer of polybenzoxazole (HPBO), and polyimide.

**This Page is Inserted by IFW Indexing and Scanning
Operations and is not part of the Official Record**

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☐ **BLACK BORDERS**
- ☐ **IMAGE CUT OFF AT TOP, BOTTOM OR SIDES**
- ☐ **FADED TEXT OR DRAWING**
- ☐ **BLURRED OR ILLEGIBLE TEXT OR DRAWING**
- ☐ **SKEWED/SLANTED IMAGES**
- ☐ **COLOR OR BLACK AND WHITE PHOTOGRAPHS**
- ☐ **GRAY SCALE DOCUMENTS**
- ☒ **LINES OR MARKS ON ORIGINAL DOCUMENT**
- ☐ **REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY**
- ☐ **OTHER:** _____

IMAGES ARE BEST AVAILABLE COPY.

As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.